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another time cold. The degree of comfort that is felt—which should not be allowed too potent an influence in deciding what one's environmental conditions shall be—depends, moreover, largely on the thickness of the clothing and on habit. It is surprising how readily one's habits in this respect may be altered. Uniformity in conditions should be avoided; too long a continuance of an existing temperature is dulling to the body; there should be not infrequent and marked changes. Artificial ventilating systems should not necessarily be condemned, but should be operated intelligently and may advantageously be combined with window ventilation.

In these days we hear much of "fresh" air and its merits. We have fresh-air funds, fresh-air schools, and fresh-air babies. All are commendable; but while giving to our funds, opening our schools, and putting our babies out of doors, let us clearly understand what constitutes fresh air. The freshness of so-called "fresh" air lies, not in more oxygen, less carbon dioxide, less organic matter of respiratory origin, and the hypothetical presence of a hypothetically stimulating ozone, but rather in a low temperature, a low humidity, and motion. So far as fresh air itself is concerned, there seems to be nothing more mysterious about it than this.

To what extent ought fresh air to be used as a therapeutic agent? Here intelligent experience, and not opinion without experience, is the only guide. That a physician, indeed, should have any article in his creed of therapeutics that is not based on the intelligent experience of somebody is not to be supposed. It can not be denied that where intelligent experience has been applied to the topic of fresh air as a therapeutic agent the use of fresh air has been almost invariably extended. But no one has a right to maintain, therefore, that it is

a panacea. Only when it has been tested in a great variety of pathological conditions—and this can be done with entire safety to the patient—will the therapeutic use and limitations of this physiologically significant agent become known.

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#### THE ORIGIN OF THE PRE-COLUMBIAN CIVILIZATION OF AMERICA

IN the whole range of ethnological discussion perhaps no theme has evoked livelier controversies and excited more widespread interest than the problems involved in the mysteries of the wonderful civilization that revealed itself to the astonished Spaniards on their first arrival in America.

During the last century, which can be regarded as covering the whole period of scientific investigation in anthropology, the opinions of those who have devoted attention to such enquiries have undergone the strangest fluctuations. If one delves into the anthropological journals of forty or fifty years ago they will be found to abound in careful studies on the part of many of the leading ethnologists of the time, demonstrating, apparently in a convincing and unquestionable manner, the spread of curious customs or beliefs from the Old World to the New. Then an element of doubt began to creep into the attitude of many ethnologists, which gradually stiffened until it set into the rigid dogma—there is no other term for it—that as the result of "the similarity of the working of the human mind" similar needs and like circumstances will lead various isolated groups of men in a similar phase of culture independently one of the other to invent similar arts and crafts, and to evolve identical beliefs. The modern generation of ethnologists has thoughtlessly seized hold of this creed and used it as a soporific drug against the need for mental exertion. For

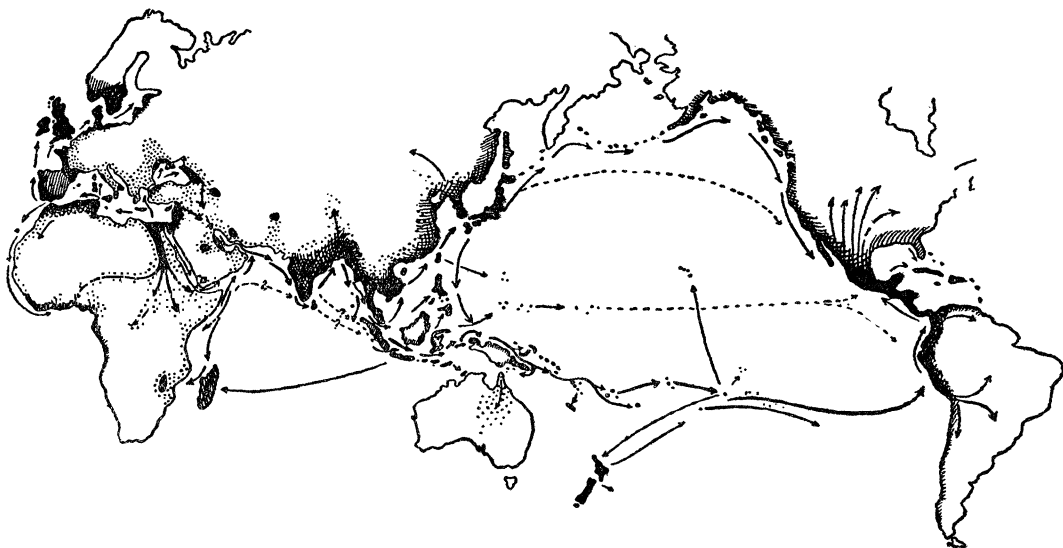
when any cultural resemblance is discovered there is no incentive on the part of those whose faculties have been so lulled to sleep to seek for an explanation: all that is necessary is to murmur the incantation and bow the knee to a fetish certainly no less puerile and unsatisfying than that of an African negro. It does not seem to occur to most modern ethnologists that the whole teaching of history is fatal to the idea of inventions being made independently. Originality is one of the rarest manifestations of human faculty. For many centuries countless millions of men must have witnessed the effects of steam before the simple and obvious inference was made and it was put to a mechanical use; but if, not knowing the history of the invention of the steam engine, we were to adopt the stereotyped ethnological doctrines of the present day the wide geographical distribution of the steam-engine should be regarded as a most striking illustration of the "similarity of the working of the human mind." Nor does it appear to have struck the orthodox ethnologist that his so-called "psychological" explanation and the meaningless phrase "similarity of the working of the human mind" run counter to all the teaching of modern psychology. For it is the outstanding feature of human instincts that they are extremely generalized and vaguely defined, and not of the precise and highly-specialized character which modern ethnological speculation attributes to them. Nor again is the case strengthened by the misuse of the word "evolution," for the independent development of such an artificial confection as civilization postulates the existence of factors utterly alien to the biologist's conception of evolution.

Why then, it will be asked, in the face of the overwhelming mass of definite and well-authenticated evidence clearly pointing to the sources in the Old World from which

American civilization sprung, do so many ethnologists refuse to accept the clear and obvious meaning of the facts and resort to such childish subterfuges as I have mentioned?

Putting aside the influence of Darwin's work, the misunderstanding of which, as Huxley remarked, "led shallow persons to talk nonsense in the name of anthropological science," the main factor in blinding so many investigators to appreciate the significance of the data they themselves so laboriously collect results from a defect incidental to the nature of their researches. The intensive study of a localized area reveals difficulties in explaining every stage in the process of transmission of customs from one spot to another, which the investigator is apt to magnify into insuperable obstacles against the view that the practises or beliefs in question did spread. The failure to recognize the fact, recently demonstrated so convincingly by Dr. Rivers, that useful arts are often lost is another, and perhaps the chief, difficulty that has stood in the way of an adequate appreciation of the history of the spread of civilization.

Bearing these considerations in mind and turning to the positive evidence that establishes the reality of the migrations of culture-bearing peoples, it will be found that there is now available a vast mass of precise and unquestionable testimony in substantiation of the conclusion that the curiously distinctive culture-complex which was gradually built up in Egypt between the years B.C. 4,000 and B.C. 900 began to be widely diffused, at some time after the latter date, west, south and east, and that the latter (the easterly migration), with many additions and modifications which it received on the way (in the Soudan, East Africa, and Arabia; in the eastern Mediterranean, Phœnicia, Armenia and Babylonia;



MAP SHOWING CULTURAL ROUTES

in India, Ceylon, Burma and the Malay Peninsula; in Indonesia and China; and finally in Polynesia) ultimately reached the Pacific coast of the Americas and leavened the aboriginal population of the vast continent with the ferment of the ancient civilizations of the Old World.

During the thirty centuries from B.C. 4,000 onwards there was built up slowly in Egypt, partly as the result of a natural and logical development, but also in part by the accidental addition of many foreign elements, a cultural fabric of a peculiarly complex and artificial texture, the pattern of which is so distinctive that it can be identified wherever and under whatsoever circumstances it occurs.

A people who in B.C. 4,000 were already acquainted with the art of weaving linen, and who practised the curious rite of circumcision, a few centuries later learned to appreciate the usefulness of metals and invented the elements of the metallurgical arts and crafts. It was the merest chance that this particular group of people should have been led by force of circumstances to have been impelled to mummify their dead.

But intimately interwoven with the development of the art of embalming and casually related to it was the making of rock-cut tombs and the building of stone superstructures, the possibility of the making of which was suggested by the use of metal tools. The use of linen was also closely related to these developments. Thus the accidental association of a series of naturally disparate factors became welded about B.C. 3,000 into the nucleus of a peculiar culture of which mummification, the making of rock-cut tombs and a great variety of megalithic monuments, the use of copper and gold and the weaving of linen, and the practise of the rite of circumcision, were some of the outstanding features.

In connection with the ritual associated with mummification statues of the deceased were made and a crop of curious beliefs and rites developed. Thus originated the belief in the indwelling of human beings in stones, and the possibility of petrifying men and animals, the rites of incense-burning and offering libations, and a whole series of other bizarre practises and beliefs, which later became so widespread as in

some measure to seem to justify the prevalent conviction that they were independent expressions of a common human instinct.

It was the merest chance that the people amongst whom this remarkable culture-complex was gradually being built up should have been sun-worshippers, and that the particular group amongst whom the royal family of Egypt originated regarded the Horus-hawk as the symbol of their royalty. It was no less fortuitous that the seat of the capital after the first unification of Egypt should have been in a place (Buto) where the uræus-serpent was venerated. Thus there is the clearest evidence that the complex symbolism of the Sun-god—the sun's disc, the serpent and the hawk's wings—is purely a chance association which was established in Egypt. The intimate connection of sun-worship and its peculiar symbolism with megalithic monuments, with mummification, and with the conception of the king as the son of the god are equally fortuitous associations.

It was no less a chance that this distinctive culture-complex was built up amongst an agricultural people who by force of circumstances were expert in a peculiar method of irrigation.

In the times of the New Empire (from B.C. 1,600 onward) a great variety of accidental accretions were made to this complicated type of civilization which for long centuries had been growing up in Egypt. Such practises as piercing the ears, and a remarkable series of new tricks in the embalmer's technique, are examples of the innovations, some of which are so definite as to enable us to state that the type of Egyptian culture-complex which was distributed so widely in the world could not have started on its wanderings before B.C. 900 at the earliest. It was probably at least a century later before the great migration left the African shores.

It reached the Persian Gulf by various routes. The fact that it passed up the Nile, through Nubia and the Soudan, thence by East Africa and the Arabian coast, is proved by a large series of Ethiopian accretions to and modifications of Egyptian practises when they appear in India and farther east. There are historical reasons for believing that a good deal of intercourse took place via the Red Sea and the Arabian littoral.

The transmission of a number of Mediterranean customs, such as the use of pearls, *Purpura* and conch-shell trumpets, and certain peculiar modifications of embalming indicate the influence of the Levant. The use of the Swastika-symbol, the peculiarly distinctive Black Sea type of dolmen, and the Armenian custom of skull deformation, are further tokens of the part taken by western Asia in adding to and modifying the purely Egyptian contributions to the strange cargoes these ancient mariners carried to India. There are also manifold witnesses of the influence of Babylonia, not only in modifying the Egyptian architectural ideas of the wanderers, but also in contributing new ideas and beliefs. An example is the greater definiteness assumed by the story of the creation, the deluge, the destruction of the sons of men by petrification, and the perpetuation of the chosen race by incestuous unions.

This cultural stream from the Persian Gulf to the Indian coast probably began at the end of the eighth century B.C. and persisted for many centuries; and the Pre-Aryan population of India became thoroughly leavened with its potent influence. Ceylon and further India, Burma and the Malay Archipelago, in turn were brought within the sphere of its activities, probably as early as the sixth and fifth centuries B.C.

From Indonesia the whole eastern Asiatic littoral and all the neighboring islands were

stirred by the new ideas; and civilizations bearing the distinctive marks of the culture-complex which I have traced from Egypt sprang up in Cochin-China, China, Corea, Japan and eventually in all the islands of the Pacific and the western coast of America. The proof of the reality of this great migration of culture is provided not merely by the identical geographical distribution of a very extensive series of curiously distinctive, and often utterly bizarre, customs and beliefs, the precise dates and circumstances of the origin of which are known in their parent countries; but the fact that these strange ingredients are compounded in a definite and highly complex manner to form an artificial cultural structure, which no theory of independent evolution can possibly explain, because chance played so large a part in building it up in its original home.

For instance, it is quite conceivable (though I believe utterly opposed to the evidence at our disposal) that different people might, independently the one of the other, have invented the practises of mummification, building megalithic monuments, circumcision, tattooing and terraced irrigation; evolved the stories of the petrification of human beings, the strange adventures of the dead in the underworld, and the divine origin of kings; and adopted sun-worship.

But why should the people of America and Egypt who built megalithic monuments build them in accordance with very definite plans compounded of Egyptian, Babylonian, Indian and East Asiatic models? And why should the same people who did so also have their wives' chins tattooed, their sons circumcised, their dead mummified? Or why should it be the same people who worshiped the sun and adopted the curiously artificial winged-sun-and-serpent symbolism, who practised terraced irrigation in precisely the same way, who made

idols and held similar beliefs regarding them, who had identical stories of the wanderings of the dead in the underworld?

If any theory of evolution of customs and beliefs is adequate to explain the independent origin of each item in the extensive repertoire, either of the New Empire Egyptian or the Pre-Columbian American civilization (which I deny), it is utterly inconceivable that the fortuitous combination of hundreds of utterly incongruous and fantastic elements could possibly have happened twice. It is idle to deny the completeness of the demonstration which the existence of such a civilization in America supplies of the fact that it was derived from the late New Empire Egyptian civilization, modified by Ethiopian, Mediterranean, West Asiatic, Indian, Indonesian, East Asiatic and Polynesian influences.

The complete overthrow of all the objections of a general nature to the recognition of the facts has already been explained. There is nothing to hinder one, therefore, from accepting the obvious significance of the evidence.

Moreover, every link in this chain of connections is admitted by investigators of localized areas along the great migration route, even by those who most strenuously deny the more extensive migrations of culture.

The connections of the New Empire Egypt with the Soudan and with Syria and its relations with Babylonia; the intercourse between the latter and India in the eighth and seventh centuries B.C.; the migrations of culture from India to Indonesia and to the farthest limits of Polynesia—all these are well authenticated and generally admitted.

All that I claim, then, is that the influence of Egypt was handed on from place to place; that the links which all ethnologists recognize as genuine bonds of union can

with equal certainty be joined up into a cultural chain uniting Egypt to America.

In almost every one of the focal points along this great migration route the folklore of to-day has preserved legends of the culture-heroes who introduced some one or other of the elements of this peculiarly distinctive civilization.

Those familiar with the literature of ethnology must be acquainted with hundreds of scraps of corroborative evidence testifying to the reality of the spread postulated. For I have mentioned only a small part of the extraordinary cargo of bizarre practises and beliefs with which these ancient mariners (carrying of course their characteristic ideas of naval construction and craftsmanship) set out from the African coast more than twenty-five centuries ago on the great expedition which eventually led their successors some centuries later to the New World.

At every spot where they touched and tarried, whether on the coasts of Asia, the islands of the Pacific or on the continent of America, the new culture took root and flourished in its own distinctive manner, as it was subjected to the influence of the aborigines or to that of later comers of other ideas and traditions; and each place became a fresh focus from which the new knowledge continued to radiate for long ages after the primary inoculation.

The first great cultural wave (or the series of waves of which it was composed) continued to flow for several centuries. It must have begun some time after B.C. 900, because the initial equipment of the great wanderers included practises which were not invented in Egypt until that time. The last of the series of ripples in the great wave set out from India just after the practise of cremation made its appearance there, for at the end of the series the custom of inciner-

ating the dead made its appearance in Indonesia, Polynesia, Mexico and elsewhere.

In asking you to publish this crude sketch of views which I have set forth in greater detail elsewhere<sup>1</sup> I wish especially to appeal to that band of American ethnologists, whose devoted labors in rescuing the information concerning the ethnography of their country have called forth the admiration of all anthropologists, seriously to reconsider the significance of the data they are amassing.

G. ELLIOT SMITH

#### THE PRODUCTION OF TUNGSTEN

THE tungsten production of the United States during the first six months of 1916 exceeded the production of this or any other country in any previous twelve months. Prices were even more phenomenal than production and reached more than ten times their ordinary level. The output was equivalent to about 3,290 short tons of concentrates carrying 60 per cent. WO<sub>3</sub>, valued at \$9,113,000, according to an estimate made by Frank L. Hess, of the United States Geological Survey, Department of the Interior. Statistics are valuable only so far as their accuracy is known, and this estimate is believed to be correct within 10 per cent. and to be under rather than over the true figures.

These figures are no less noteworthy when it is known that in 1915 much the larger part of the production was in the second half of the year, so that the total domestic output for the twelve months ending June 30, 1916, probably amounted to about 5,000 tons.

Colorado has regained its lead in the production of tungsten ores and, between January 1 and June 30, marketed 1,505 tons, valued at \$3,638,000, of which the Boulder field furnished 1,494 tons. California sold 984 tons, valued at \$3,005,000. The reason for the higher value of the California ore was that it

<sup>1</sup> "The Significance of the Geographical Distribution of the Practise of Mummification," now being published in the *Memoirs of the Literary and Philosophical Society of Manchester*.